# Section 3
# Potential Benefits

**Introduction:**

To define appropriate measurement, it is necessary to characterize the expected benefits associated with any possible changes to agriculture water measurement approaches.

Estimates of potential benefits were developed for 21 agricultural measurement alternatives. Each measurement alternative is defined by two parameters: (1) generic measurement location; and, (2) potential measurement improvement.

Generic measurement location refers to the physical location of water use measurement. Seven measurement locations are addressed by the analysis: (1) surface water diversions; (2) groundwater use; (3) crop consumption; (4) return flow; (5) water quality; (6) stream gauging; and, (7) farm-gate deliveries.

Measurement improvement level describes how the estimate or measurement procedure quantifies the volume or quality of water moving past a measurement point. Three measurement improvement levels are used for this analysis: 1) basic, 2) high and 3) highest technically practical. More detailed definitions of these measurement locations and intensities are provided in Section 1.

Unlike the cost analysis, however, the characterization of benefits is qualitative in nature. The analysis presented below attempts to articulate – for each of the 21 alternatives (7 locations times 3 potential improvements) – the potential benefits for state and federal objectives related to planning, water availability determination, transfers and water use efficiency. In articulating the benefits, the Technical Team has sought to put forward a rigorous analysis that articulates: what information you get from each measurement alternative and, how that data can be used to meet state and federal objectives and why that is of value.

The analysis also provides a brief assessment of potential local benefits that may be associated with changes in measurement approaches. (This step is consistent with guidance offered during past Panel discussions that, while the focus of this CALFED Record of Decision commitment should be on statewide objectives, it is important to at least acknowledge and articulate possible local benefits as well.)

**Approach**

The benefits analysis, like the cost counterpart (Section 4), acknowledges and builds off the current baseline. The Technical Team recognizes that the current approach to measurement is shaped both by local needs and conditions and by existing state and federal mandates. Each region has adopted a measurement strategy that, in a cost-effective manner, delivers the data needed to operate and meet local objectives and requirements in an efficient manner. This baseline is summarized in Section 2.

Still, CALFED recognizes that different approaches to agricultural water use measurement – either from changing hardware, data collection or data management strategies – might have an important and beneficial impact on state and federal agencies' ability to meet objectives related to planning, allocation, transfers and water use efficiency. To assess this potential – and based on recommendations developed by the Panel during interim deliberations – the Technical Team took a number of steps:

- ***Stakeholder Interviews.*** Technical Team members conducted detailed interviews with diverse stakeholder representatives throughout the state to gauge their views on the limitations of the current measurement approach and identify specific changes that might help state and federal managers better meet their objectives. (The interviews also sought to characterize likely benefits to locals, as well as any potential implementation barriers.)

- ***Agency Interviews.*** In addition to the stakeholder interviews, Technical Team members conducted detailed interviews with representatives of state and federal agencies responsible for statewide water planning and water rights administration. Interviews were structured to gauge their views on the limitations of the current measurement approach and identify specific changes that might help them carry out their responsibilities and objectives.

- ***Statutory and Regulatory Review.*** Technical Team representatives catalogued the range of federal, state and local statutes and regulations shaping current agricultural water use measurement. This review focused, in particular, on identifying any gaps or inconsistencies within the current regime that hampers the state's ability to meet its objectives. It also, coupled with the stakeholder interviews, provided a snapshot of local implementation of existing laws and regulations.

- ***Review of Other States' Approaches.*** At the Panel's urging, the Technical Team also undertook a strategic review of other state's approaches to and experiences with agricultural water use measurement. Though California's history and needs are distinct from other states, the intent of this step was to glean learnings from other states regarding successful approaches and important considerations related to measurement.

Given the qualitative nature of the findings, the Technical Team took several steps to synthesize and characterize its assessment of potential benefits – first by region, then on a statewide view. These included:

- Step 1: Identifying changes in the type or quality of the data generated by each distinct measurement upgrade. In short: What information do you get from the measurement?

- Step 2: Describing the value of the new data to the attainment of each of the four state objectives identified by the Panel as being paramount. Or, in other words: What can the information be used for?

- Step 3: Describing the likely local benefit associated with the additional data being collected.

- Step 4: Based on the results of the interviews mentioned above and the Technical Team's professional judgement, the expected benefits were characterized as either none, low, medium or high as described below:

  - ***None:*** Negligible benefit to the given objective.

  - ***Low:*** Only a limited gain in type or reliability of available data or minimal impact on state and federal objectives compared with the next lowest measurement intensity.

  - ***Medium:*** A moderate gain in type or reliability of available data and significant impact on state and federal objectives compared with the next lowest measurement intensity.

  - ***High:*** A significant gain in type or reliability of available data and a highly significant impact on state and federal objectives compared with the next lowest measurement intensity.

- Step 5: Reviewing the necessarily subjective rankings described above with informed stakeholder and state and federal agency representatives to confirm the appropriateness of the findings and associated rankings. A summary of the rankings for the findings are given in Table 3.1.

Table 3.2 presents the detail of the type of information that is collected at each generic measurement location for each of the measurement improvement levels.

**Summary of Results**

The analysis offers a snapshot of the Technical Team's assessment of potential benefits associated with each specific measurement improvement.

The analysis is aggregated into a statewide summary, since – in most cases – the potential benefits appear to be similar from region to region. In those cases where there are likely to be meaningful regional distinctions – return flow, water quality and stream gauging – the narrative calls out these differences or uncertainties.

- ***Surface Water Diversions.*** Upgrading surface water diversions from "high" intensity to "highest technically practical" will: (1) enable a more efficient and effective review of water availability determination, water rights applications, transfers and dispute resolutions; and (2) enable more effective planning (i.e., Bulletins 160 and 118). It is expected to generate significant benefits related to the verification of some types of water transfers. Water use efficiency-related benefits are low, unless coupled with other water balance components that are necessary to analyze various opportunities.

- ***Groundwater Use.*** Upgrading groundwater use to "high" statewide is expected to generate more reliable and consistent net groundwater use data. Additionally, it will help, support conjunctive use investigations, enable more effective planning

(Bulletins 160 and 118) and provide an independent check that the State role is appropriate. "Highest technically practical" measurement is capable of generating significantly better data (both in detail and reliability, which may be particularly important in adjudicated basins or to verify groundwater substitution transfers. This improved data is expected to result in refined water balance calculations that are critical for planning purposes. Water use efficiency-related benefits are low, unless coupled with other water balance components necessary to analyze various opportunities for improved water management.

- ***Crop Consumption.*** Upgrading measurement to "high" – in other words, remote sensing based on a monthly time-step – will provide a direct measurement of crop water consumption, rather than a theoretical estimate. Since crop consumption represents approximately 65% of consumptive water use, this improved data is expected to result in vastly refined water balance calculations that are critical for planning purposes. Upgrading crop consumption measurement to "highest technically practical" – remote sensing based on a 16-day time-step – is not expected to yield a meaningful improvement in information value over "high."

- ***Return Flow.*** Upgrading measurement to "highest technically practical" can yield important benefits in instances where, for example, there is a need for better monitoring and protection of third-party water-user impacts, more accurate water balances or to provide flow information for water quality investigations. In those instances where better data is needed, "high" is not good enough due to the highly variable nature of the flows. "High" is likely to generate good enough data to help guide and track water use efficiency investments and performance measures.

- ***Water Quality.*** Measurement at the "high" or "highest technically practical" can generate significantly improved and important information in those locations where there are place- and constituent-specific needs associated with water quality monitoring. This additional information can better assist state and federal planners in: (1) guiding infrastructure investments, (2) processing water rights applications and permits, (3) make transfer determinations and, (4) guide and track water use efficiency investments. The specific benefits of one intensity level versus another can only be determined on a case-by-case basis. Water use efficiency benefits are likely to be low at the "high" level, unless coupled with other water balance components necessary to analyze various opportunities for improved water management. Water transfer benefits are likely to be low unless coupled with other measurement components required to verify the activities.

- ***Stream Gauging.*** Improving the data generated by stream gauging can have significant impacts on the state's ability to pursue objectives related to planning, water availability determination and water transfers. With more accurate data, the state can improve its water balances, better monitor and verify water transfers and possibly improve estimates of riparian water use. It is unclear, however, whether the state's current approach to stream gauging – intensity level and distribution – is sufficient to support these objectives. Water use efficiency benefits are likely to be low at the "high" level of measurement, unless coupled with other water balance components necessary to analyze various opportunities for improved water

management. There appears to be only incremental benefits for water use efficiency objectives in moving to the "highest technically practical" level.

- ***Farm-Gate Deliveries.*** Though there appears to be a great deal of infrastructure in place to track farm-gate deliveries – the baseline analysis suggests more than 90% of turnouts statewide are at "high" or "highest technically practical" – it is not known if the data is consistently collected, analyzed, stored and reported. Accordingly, upgrading measurement at this location to include more uniform reporting and quality control – even at the "basic" level – can yield significant benefits for state and federal agencies seeking to guide and track water use efficiency investments. Upgrading to "high" can also generate important benefits, but only if statewide policymakers decide to implement volumetric pricing or water use efficiency practices that require more accurate farm-gate data. "Highest technically practical" appears to generate only minimal incremental benefits over "at least high."

Table 3.1 Relative benefits* of agricultural measurement by location and objective.

| Measurement | | Ability of Given Location and Intensity to Support State and Federal Water Management Objectives | | | |
|---|---|---|---|---|---|
| Generic Location | Potential Improvement | Planning | Water Use Efficiency | Water Availability | Water Transfers |
| Surface Water Diversion | Basic | LOW | LOW | NONE | LOW |
| | High | LOW | MEDIUM | NONE | LOW |
| | Highest Technically Practical | HIGH | NONE | HIGH | MEDIUM |
| Groundwater Use | Basic | LOW | LOW | NONE | LOW |
| | High | HIGH | MEDIUM | LOW | HIGH |
| | Highest Technically Practical | LOW | LOW | LOW | HIGH |
| Crop Consumption | Basic | LOW | LOW | LOW | LOW |
| | High | HIGH | HIGH | HIGH | HIGH |
| | Highest Technically Practical | LOW | LOW | LOW | LOW |
| Return flow | Basic | LOW | LOW | LOW | LOW |
| | High | LOW | MEDIUM | LOW | LOW |
| | Highest Technically Practical | HIGH | MEDIUM | HIGH | MEDIUM |
| Water Quality | Basic | LOW | LOW | NONE | NONE |
| | High | HIGH | MEDIUM | MEDIUM | MEDIUM |
| | Highest Technically Practical | HIGH | MEDIUM | MEDIUM | MEDIUM |
| Stream Gauging | Basic | LOW | LOW | LOW | LOW |
| | High | MEDIUM | MEDIUM | MEDIUM | MEDIUM |
| | Highest Technically Practical | LOW | NONE | MEDIUM | MEDIUM |
| Farm-gate deliveries | Basic | HIGH | HIGH | NONE | NONE |
| | High | MEDIUM | MEDIUM | LOW | LOW |
| | Highest Technically Practical | LOW | NONE | LOW | LOW |

*Measurement at the given location and improvement level would create:
NONE: negligible benefit to the given objective LOW: limited benefit to the given objective
MEDIUM: moderate benefit to the given objective HIGH: siginificant benefit to the given objective

**Table 3.2. Information and benefits of measurement improvements at key locations for statewide and local objectives.**

*details on objectives for Local, Water Availability and Water Transfers continued on next page*

| Generic Measurement Location | Potential Improvement Level | Planning | | Water Use Efficiency | |
|---|---|---|---|---|---|
| | | what information do you get from this measurement? | what is the benefit of this information | what information do you get from this measurement? | what is the benefit of this information |
| Surface Water Diversion | Basic | - most all diversions are beyond this level<br>- provide information on riparian and supplier diversions | - estimate riparian use<br>- planning requires a higher degree of accuracy<br>- LOW | - most all diversions are beyond this level<br>- provide information on riparian and supplier diversions | - estimate riparian use<br>- WUE requires a higher degree of accuracy<br>- LOW |
| | High | -same information as above but with higher accuracy | - incremental benefit<br>- LOW | - most all diversions are at this level<br>- provide information on riparian and supplier diversions | - helps determine if $ spent have generated benefits<br>- helps guide investment $<br>- enables development and monitoring of better quantified WUE performance measures<br>- must be coupled with other water balance components as needed<br>- if not coupled LOW<br>- if coupled then MEDIUM to HIGH |
| | Highest Technically Practical | -same information as above but with higher accuracy | - planning for future water needs<br>- prepare local, regional, basin water balances<br>- guide infrastructure investment HIGH | -same information as above but with higher accuracy | - minimal incremental benefit<br>NONE |

**Table 3.2. Continued.**

| Generic Measurement Location | Potential Improvement Level | Local | | Water Availability | | Water Transfers | |
|---|---|---|---|---|---|---|---|
| | | what information do you get from this measurement? | what is the benefit of this information | what information do you get from this measurement? | what is the benefit of this information | what information do you get from this measurement? | what is the benefit of this information |
| Surface Water Diversion | Basic | - most all diversions are beyond this level<br>- provide information on riparian and supplier diversions | - estimate riparian use | - most all diversions are beyond this level<br>- provide information on riparian and supplier diversions | - water right processing needs a higher degree of accuracy<br>NONE | - most all diversions are beyond this level<br>- provide information on riparian and supplier diversions | - water Transfer verification needs a higher degree of accuracy<br>LOW |
| | High | - most all diversions are at this level<br>- provide information on riparian and supplier diversions | | - most all diversions are at this level<br>- provide information on riparian and supplier diversions | - minimal incremental benefit<br>NONE | - most all diversions are at this level<br>- provide information on riparian and supplier diversions | - minimal incremental benefit<br>LOW |
| | Highest Technically Practical | - accurate information about diversions | - improved water management<br>- help protect water rights | -same information as above but with higher accuracy | - process water right applications, permits and licenses<br>- legitimize the decision making<br>- transparancy of decision making<br>HIGH | -same information as above but with higher accuracy | - monitor and verify transferred water<br>- must be coupled with other water balance components as needed<br>- allows monitoring for 3rd party impacts<br>if not coupled LOW<br>if coupled then MEDIUM to HIGH |

**Table 3.2. Information and benefits of measurement improvements at key locations for statewide and local objectives.**

*details on objectives for Local, Water Availability and Water Transfers continued on next page*

| Generic Measurement Location | Potential Improvement Level | Planning | | Water Use Efficiency | |
|---|---|---|---|---|---|
| | | what information do you get from this measurement? | what is the benefit of this information | what information do you get from this measurement? | what is the benefit of this information |
| Groundwater Use | Basic | - estimate of groundwater use by region | - minimal benefit<br>LOW | - estimate of groundwater use by region | - minimal benefit<br>LOW |
| | High | - net groundwater use by sub-basin<br>- sub-basin groundwater hydrologic balances | - planning for future water needs<br>- prepare local, regional, basin water balances<br>- guide infrastructure investment<br>- unprecenented characterization of net gw use<br>- provides independent check that state role is appropriate<br>HIGH | - net groundwater use by sub-basin<br>- sub-basin groundwater hydrologic balances | - helps determine if $ spent have generated benefits<br>- helps guide investment $<br>- enables development and monitoring of better quantified WUE performance measures<br>- must be coupled with other water balance components as needed<br>- if not coupled LOW<br>- if coupled then MEDIUM to HIGH |
| | Highest Technically Practical | - gross volume of groundwater pumped from each well<br>- second method of rigorously estimating groundwater use | - groundwater quality modeling<br>- minimal incremental benefit<br>LOW | - gross volume of groundwater pumped from each well<br>- second method of rigorously estimating groundwater use | - minimal incremental benefit<br>LOW |
| Crop Consumption | Basic | - estimates of crop water use by region | - minimal benefit<br>LOW | - estimates of crop water use by region | - minimal benefit<br>LOW |
| | High | - unprecedented characterization of crop water use | - planning for future water needs<br>- prepare local, regional, basin water balances<br>- thorough check on crop water use<br>- information about basin efficiency<br>HIGH | - unprecenented characterization of crop water use | - helps determine if $ spent have generated benefits<br>- helps guide investment $<br>- enables development and monitoring of better quantified WUE performance measures<br>- must be coupled with other water balance components as needed<br>HIGH |
| | Highest Technically Practical | -same information as above but with higher accuracy | - same as above<br>LOW | -same information as above but with higher accuracy | - same as above<br>LOW |

**Table 3.2. Continued.**

| Generic Measurement Location | Potential Improvement Level | Local | | Water Availability | | Water Transfers | |
|---|---|---|---|---|---|---|---|
| | | what information do you get from this measurement? | what is the benefit of this information | what information do you get from this measurement? | what is the benefit of this information | what information do you get from this measurement? | what is the benefit of this information |
| Groundwater Use | Basic | - estimate of groundwater use by region | - minimal benefit | - estimate of groundwater use by region | - minimal benefit<br>NONE | - estimate of groundwater use by region | - minimal benefit<br>LOW |
| | High | - net groundwater use by sub-basin<br>- sub-basin groundwater hydrologic balances | - supports AB3030 basin water management planning<br>- gives growers more information for water management | - net groundwater use by sub-basin<br>- sub-basin groundwater hydrologic balances | - gw not currently allocated and is a personal property and improved measurement will not affect this aspect<br>- under current state law benefit is LOW because state does not currently allocate<br>- moves to HIGH if state groundwater law changes or basin becom | - net groundwater use by sub-basin<br>- sub-basin groundwater hydrologic balances | - allows monitoring of 3rd party water user impacts<br>- more complete water balances for stream - aquifer interaction, gw extraction that affect local users<br>- for non-groundwater transfers coupled with other water balance measurements<br>HIGH |
| | Highest Technically Practical | - gross volume of groundwater pumped from each well<br>- second method of rigorously estimating groundwater use | - minimal incremental benefit | - gross volume of groundwater pumped from each well<br>- second method of rigorously estimating groundwater use | - minimal incremental benefit<br>LOW | - gross volume of groundwater pumped from each well<br>- second method of rigorously estimating groundwater use | - verification if groundwater substituion Transfer<br>HIGH |
| Crop Consumption | Basic | - estimates of crop water use by region | - minimal benefit | - estimates of crop water use by region | - minimal benefit<br>LOW | - estimates of crop water use by region | - minimal benefit<br>LOW |
| | High | - unprecenented characterization of crop water use | - help district internal allocation of water<br>- help growers schedule irrigations<br>- helps districts in long-term planning<br>- help protect water rights | - unprecenented characterization of crop water use | - thorough check on crop water use for consumptive use determination<br>- helps define reasonable and beneficial use of water<br>- helps determine if basin is overallocated<br>- coupling potential with other water balance components<br>HIGH | - unprecenented characterization of crop water use | - thorough check on crop water use for consumptive use determination<br>- helps verify changes in consumptive use<br>- coupling potential with other water balance components<br>HIGH |
| | Highest Technically Practical | -same information as above but with higher accuracy | - same as above | -same information as above but with higher accuracy | - same as above<br>LOW | -same information as above but with higher accuracy | - same as above<br>LOW |

**Table 3.2. Information and benefits of measurement improvements at key locations for statewide and local objectives.**

*details on objectives for Local, Water Availability and Water Transfers continued on next page*

| Generic Measurement Location | Potential Improvement Level | Planning | | Water Use Efficiency | |
|---|---|---|---|---|---|
| | | what information do you get from this measurement? | what is the benefit of this information | what information do you get from this measurement? | what is the benefit of this information |
| Return flow | Basic | - discrete estimate of highly variable flows | - minimal benefit<br>LOW | - discrete estimate of highly variable flows | - minimal benefit<br>LOW |
| | High | -same information as above but with higher accuracy | - planning for future water needs<br>- prepare local, regional, basin water balances<br>- guide infrastructure investment<br>LOW | -same information as above but with higher accuracy | - helps determine if $ spent have generated benefits<br>- helps guide investment $<br>- enables development and monitoring of better quantified WUE performance measures<br>- must be coupled with other water balance components as needed<br>- if not coupled LOW<br>- if coupled then MEDIUM TO HIGH |
| | Highest Technically Practical | - provides substantial improvement in determining return flows | - same as above<br>HIGH | - provides substantial improvement in determining return flows | - same as above<br>MEDIUM |
| Water Quality | Basic | - point in time information of constituent measured | - minimal benefit<br>LOW | - point in time information of constituent measured | - minimal benefit<br>LOW |
| | High | - most all water quality stations are at this level<br>- establish water quality baselines<br>- more stations are needed | - planning for future water needs<br>- prepare local, regional, basin water balances<br>- guide infrastructure investment<br>HIGH | - most all water quality stations are at this level<br>- establish water quality baselines<br>- number of stations needed dependent on type of WUE project | - helps determine if $ spent have generated benefits<br>- helps guide investment $<br>- enables development and monitoring of better quantified WUE performance measures<br>- must be coupled with other water balance components as needed<br>- if not coupled LOW<br>- if coupled then MEDIUM to HIGH |
| | Highest Technically Practical | - provides additional data points<br>- applicable to constituents that can be monitored real time | - same as above<br>HIGH | - provides additional data points<br>- applicable to constituents that can be monitored real time | - minimal incremental benefit<br>MEDIUM |

**Table 3.2. Continued.**

| Generic Measurement Location | Potential Improvement Level | Local | | Water Availability | | Water Transfers | |
|---|---|---|---|---|---|---|---|
| | | what information do you get from this measurement? | what is the benefit of this information | what information do you get from this measurement? | what is the benefit of this information | what information do you get from this measurement? | what is the benefit of this information |
| Return flow | Basic | - discrete estimate of highly variable flows | - minimal benefit | - discrete estimate of highly variable flows | - minimal benefit<br>LOW | - discrete estimate of highly variable flows | - minimal benefit<br>LOW |
| | High | -same information as above but with higher accuracy | - improved water management<br>- help protect water rights<br>- respond to regulatory requirements | -same information as above but with higher accuracy | - water rights determination needs a higher degree of accuracy<br>LOW | -same information as above but with higher accuracy | - water transfer verification needs a higher degree of accuracy<br>LOW |
| | Highest Technically Practical | - provides substantial improvement in determining return flows | same as above | - provides substantial improvement in determining return flows | - process water right applications, permits and licenses<br>- legitimize and make transparent the decision making process<br>HIGH | - provides substantial improvement in determining return flows | - help state make more valid determination of transferable water<br>- must be coupled with other water balance needs<br>- if not coupled LOW<br>- if coupled then MEDIUM to HIGH |
| Water Quality | Basic | - point in time information of constituent measured | - provide reference for leaching determination | - point in time information of constituent measured | - minimal benefit<br>NONE | - point in time information of constituent measured | - minimal benefit<br>NONE |
| | High | - establish water quality baselines | - help protect water rights<br>- meet requlatory requirements | - most all water quality stations are at this level<br>- establish water quality baselines<br>- more stations are needed | - process water right applications, permits and liscenses<br>- legitimize the decision making<br>- transparancy of decision making<br>MEDIUM | - most all water quality stations are at this level<br>- establish water quality baseline<br>- number of stations needed dependent on type of transfer | - help state make more valid determination of transferable water<br>- must be coupled with other water balance needs<br>- if not coupled LOW<br>- if coupled then MEDIUM to HIGH |
| | Highest Technically Practical | | same as above | - provides additional data points<br>- applicable to constituents that can be monitored real time | - same as above<br>MEDIUM | - provides additional data points<br>- applicable to constituents that can be monitored real time | - minmal incremental benefit<br>MEDIUM |

**Table 3.2. Information and benefits of measurement improvements at key locations for statewide and local objectives.**

*details on objectives for Local, Water Availability and Water Transfers continued on next page*

| Generic Measurement Location | Potential Improvement Level | Planning | | Water Use Efficiency | |
|---|---|---|---|---|---|
| | | what information do you get from this measurement? | what is the benefit of this information | what information do you get from this measurement? | what is the benefit of this information |
| Stream Guaging | Basic | - all existing guaging stations are at least this level<br>- more stations needed | - minimal benefit<br>LOW | - all existing guaging stations are at least this level<br>- more stations needed | - minimal benefit<br>LOW |
| | High | - all existing guaging stations are at this level<br>- more stations needed<br>- improvement in information about water diversion, return and stream flows | - prepare local, regional, basin water balances<br>- potential to get information about riparian diversions when coupled<br>MEDIUM | - all existing guaging stations are at this level<br>- improvement in information about water diversion, return and stream flows | - helps determine if $ spent have generated benefits<br>- helps guide investment $<br>- enables development and monitoring of better quantified WUE performance measures<br>- must be coupled with other water balance components as needed<br>- if not coupled LOW<br>- if coupled then MEDIUM to HIGH |
| | Highest Technically Practical | -same information as above but with higher accuracy | - minimal incremental benefit<br>LOW | -same information as above but with higher accuracy | - minimal incremental benefit<br>NONE |

**Table 3.2. Continued.**

| Generic Measurement Location | Potential Improvement Level | Local | | Water Availability | | Water Transfers | |
|---|---|---|---|---|---|---|---|
| | | what information do you get from this measurement? | what is the benefit of this information | what information do you get from this measurement? | what is the benefit of this information | what information do you get from this measurement? | what is the benefit of this information |
| Stream Guaging | Basic | - all existing guaging stations are at least this level<br>- more stations needed | | - all existing guaging stations are at least this level<br>- more stations needed | - minimal benefit<br>LOW | - all existing guaging stations are at least this level<br>- more stations needed | - minimal benefit<br>LOW |
| | High | | - help protect water rights | - all existing guaging stations are at this level<br>- more stations needed<br>- improvement in information about water diversion, return and stream flows | - prepare local, regional, basin water balances<br>- potential to get information about riparian diversions when coupled<br>MEDIUM | - all existing guaging stations are at this level<br>- more stations needed when transferring<br>- improvement in information about water diversion, return and stream flows | - provide monitoring and verification of transferred water<br>- protect 3rd party from impacts of transfers<br>MEDIUM |
| | Highest Technically Practical | -same information as above but with higher accuracy | - help protect water rights | -same information as above but with higher accuracy | - prepare local, regional, basin water balances<br>- potential to get information about riparian diversions when coupled<br>MEDIUM | -same information as above but with higher accuracy | - more stations needed<br>- potential to get information about riparian diversions when coupled<br>- provides information on 3rd party impacts<br>MEDIUM |

**Table 3.2. Information and benefits of measurement improvements at key locations for statewide and local objectives.**

*details on objectives for Local, Water Availability and Water Transfers continued on next page*

| Generic Measurement Location | Potential Improvement Level | Planning | | Water Use Efficiency | |
|---|---|---|---|---|---|
| | | what information do you get from this measurement? | what is the benefit of this information | what information do you get from this measurement? | what is the benefit of this information |
| Farm-gate deliveries | Basic | - provides information about aggregate application values | - allows delineation of farm and district flows<br>HIGH | - provides information about aggregate application values | - allows delineation of farm and district flows<br>HIGH |
| | At least periodic | -same information as above but with higher accuracy | - same as above<br>- preparation of local water balances through aggregate application values<br>MEDIUM | -same information as above but with higher accuracy | - helps determine if $ spent have generated benefits<br>- helps guide investment $<br>- enables development and monitoring of better quantified WUE performance measures<br>- must be coupled with other water balance components as needed<br>- if not coupled LOW<br>- if coupled then MEDIUM to HIGH |
| | All continuous | -same information as above but with higher accuracy | - same as above<br>LOW | -same information as above but with higher accuracy | - minimal incremental benefit<br>NONE |

**Table 3.2. Continued.**

| Generic Measurement Location | Potential Improvement Level | Local | | Water Availability | | Water Transfers | |
|---|---|---|---|---|---|---|---|
| | | what information do you get from this measurement? | what is the benefit of this information | what information do you get from this measurement? | what is the benefit of this information | what information do you get from this measurement? | what is the benefit of this information |
| Farm-gate deliveries | Basic | - provides information about aggregate application values | -allows growers to do irrigation scheduling and evaluation<br>- provide ability for volumetric billing and tiered pricing<br>- provides signal to grower regarding value of water<br>- assures growers that they are getting their fair share<br>- serve water rights | - provides information about aggregate application values | - minimal benefit<br>NONE | - provides information about aggregate application values | - minimal benefit<br>NONE |
| | At least periodic | -same information as above but with higher accuracy | - same as above | -same information as above but with higher accuracy | not applicable because water rights determination needs a high degree of accuracy<br>LOW | -same information as above but with higher accuracy | not applicable because water rights determination needs a high degree of accuracy<br>LOW |
| | All continuous | - providesmore accurate information about aggregate application values | - minimal incremental benefit | -same information as above but with higher accuracy | - same as above<br>LOW | -same information as above but with higher accuracy | - Transfers will generally be consumption based and done at the supplier level<br>LOW |